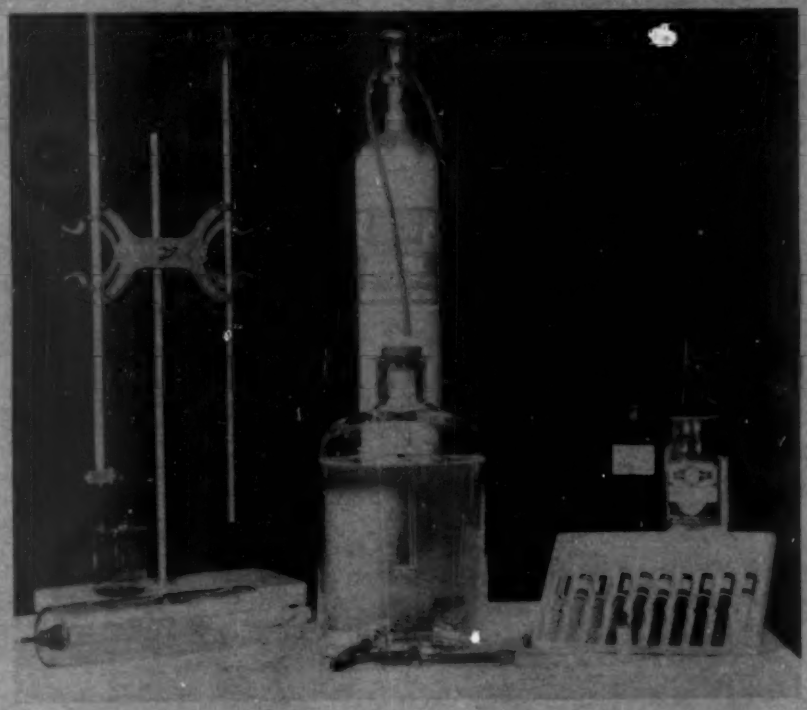
THE BULLETIN

OF THE

AMERICAN SOCIETY OF HOSPITAL PHARMACISTS



PREPARATION OF SODIUM BICARBONATE FOR INJECTION

VOLUME 2 JULY-AUGUST, 1945 NUMBER 4

American Society of Hospital Pharmacists

Affiliated With The

American Pharmaceutical Association

CONSTITUTION and BY-LAWS

Article I.—NAME. The name of this organization shall be The American Society of Hospital Pharmacists.

Article II.—OBJECTIVES. The objectives of the Society shall be to improve and extend the usefulness of the hospital pharmacist to the institution he serves, to the members of the other health professions with whom he is associated, and to the profession of pharmacy by:

FIRST—Establishing minimum standards of pharmaceutical service in hospitals, in order to provide benefits and protection for the public health which it will receive by the skill and art of qualified hospital pharmacists; and to insure for the future an adequate supply of such qualified hospital pharmacists by providing a standardized hospital training for four-year pharmacy graduates who have elected a specialized hospital pharmacy course.

SECOND — Providing for interchange of information among pharmacists by encouraging initiative in the development of new pharmaceutical techniques, and by maintaining a close pharmaceutical contact between hospital pharmacists and those engaged in general pharmaceutical practice.

THIRD—Aiding the medical profession in extending the economic and rational use of medicaments.

Article III.—MEMBERSHIP

Section 1. (a)—ACTIVE MEMBERS of this Society shall be registered pharmacists in good professional standing, who are members of the American Pharmaceutical Association and whose practice has been essentially connected with hospitals, clinics and dispensaries for a period of one year.

(b) HONORARY MEMBERS may be elected from among the individuals who are especially interested in hospital practice. Honorary members shall not pay dues, nor shall they be eligible to vote or to hold office.

(c) ASSOCIATE MEMBERS may be elected from among individuals other than hospital pharmacists, who, by their work in the health services, the teaching of prospective hospital pharmacists, or otherwise contributing to hospital pharmacy, make themselves eligible to membership. Associate members shall not be entitled to hold office or to vote. Associate members should be members of the American Pharmaceutical Association.

Section 2.—Applications for membership shall be received by the Committee on Membership and shall be acted upon by the Executive Committee on the recommendation of said Committee on Membership.

Article IV.—OFFICERS. The officers of this Society shall be a Chairman, a Vice-chairman, a Secretary, and a Treasurer, all of whom shall be elected annually, and none of whom, with the exception of the Secretary and Treasurer, may hold office for more than two consecutive terms.

Article V.—AMENDMENTS. Every proposition to alter or amend this Constitution shall be made by two members at an annual meeting of the Society and shall be voted upon by ballot of the members of the Society by mail at least one month subsequent to the annual meeting. All ballots to be eligible for voting must be post-marked within thirty (30) days of the date of the ballot.

Chapter I.—ELECTION OF OFFICERS. At the first session of each annual meeting of this Society, the Chairman shall appoint a committee of three members who shall submit nominations for each office of the Society for the ensuing year. The Committee shall present its nominations at the final session of the annual meeting at which time additional nominations may be made from the floor. They shall be voted upon by ballot of the members of the Society by mail at least one month subsequent to the annual meeting. All ballots to be eligible for voting must be post-marked within thirty (30) days of the date of the ballot. A majority of such votes cast shall constitute election.

Chapter II.—DUTIES OF OFFICERS:

Article 1.—CHAIRMAN and VICE-CHAIRMAN. The Chairman, or in his absence, the Vice-chairman, shall preside at all meetings. He will appoint all committees not otherwise provided for and shall be ex-officio member of all committees. He shall prepare a Chairman's address to be presented at the first session of the annual meeting of the Society following his installation.

Article 2.—SECRETARY. The Secretary shall keep minutes of the sessions of the Society and maintain a roll of its members. He shall notify individuals of their appointment to committees, notify members of the time and place of all meetings, and conduct the correspondence of the Society. He shall present a written report of his work to the annual meeting of the Society. He shall collect the dues of the members.

Article 3.—TREASURER. The Treasurer shall receive and keep account of all moneys received by the Society in the form of dues or remittances and shall disburse them at the direction of the Executive Committee or at the direction of the Finance Committee.

Chapter III.—EXECUTIVE COMMITTEE. The Executive Committee shall consist of the Officers of the Society and the Chairman of each standing committee. It shall meet on the call of the Chairman of the Society, shall have supervision over the expenditure of all funds of the Society, and shall be empowered to act for the Society during the period between annual meetings.

Chapter IV.—FINANCES. The membership dues of this Society shall be three dollars ($3.00) per year, payable January first of each year. Accepted regional groups consisting of twenty (20) or more members, or local groups consisting of ten (10) or more members shall collect dues for the American Society of Hospital Pharmacists. These groups may apply to the Executive Committee for refund in the amount of one dollar ($1.00) per year for each active or associate member. Refunds shall be paid within sixty (60) days after payment to the American Society of Hospital Pharmacists. This amendment is retroactive to January first, 1944.

Chapter V.—STANDING COMMITTEES. There shall be five standing committees of the Society; each consisting of three members appointed by the Chairman of the Society, with the approval of the Executive Committee.

continued inside back cover

THE BULLETIN
OF THE
AMERICAN SOCIETY of HOSPITAL PHARMACISTS

Vol. 2 July - August 1945 No. 4

The Bulletin is published bimonthly by the American Society of Hospital Pharmacists, a national organization devoted to the profession of Hospital Pharmacy, dedicated to the interests of the Hospital Pharmacist, and pledged to co-operate with the American Pharmaceutical Association with which it is affiliated.

Contributions of articles by hospital pharmacists, or by others interested in the progress of this important branch of the Public Health profession, will be accepted if they are of general interest to the hospital pharmacist. The Editor reserves the right to revise all material submitted, if necessary.

Manuscripts submitted for publication should be typewritten in double spacing on one side of paper 8½" x 11". Whenever possible a photograph, drawing, or printed form to illustrate the topic that is discussed in the article should be included.

Editor

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Associate Editor

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and

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1313 Ann Street
Ann Arbor,
Michigan

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Correspondence

Sirs: I wish to acknowledge, with thanks, the complimentary copy of your BULLETIN. It is certainly one of the finest and newsiest periodicals I have ever read. It surely fills a great need. I am interested in joining both your Society and the American Pharmaceutical Association. Would you please send me an application blank for both. Also tell me what the dues will be for each. Again thanking you for sending THE BULLETIN, and hoping to hear from you soon with full information, I am

John H. Kitzinger
U.S. Marine Hospital
Chicago 13, Illinois

Sirs: Enclosed find a check for three dollars for membership dues for 1945. I appreciate the work of all the officers, I also enjoy the new BULLETIN.

Leo D. Goetz
Good Samaritan Hospital
Dayton, Ohio

Sirs: Commendation is in order for the new format for THE BULLETIN of the American Society of Hospital Pharmacists. Personally, I believe it is again a noteworthy milestone in the rapid advancement of our Society. The comments of fellow hospital pharmacists ranged from "excellent" to "it will be one of the leading practical and informative publications in pharmacy". The well constructed sections such as "Current Literature of Hospital Pharmacy" and "Notes and Suggestions" are brief and pithy sections with excellent information of practical value.

John J. Zugich
Oak Ridge Hospital
Oak Ridge, Tennessee

Sirs: Your publication, THE BULLETIN, reached my office this week. I think it is excellent. I hope you will soon find it possible to print the same. Would it be possible to obtain past numbers? We have Volume 2; Numbers 2 and 3. We shall bind and keep a complete file of these in our library.

L. S. Blake, Dean
School of Pharmacy
Alabama Polytechnic Institute
Auburn, Alabama

BACK ISSUES OF THE BULLETIN, WITH THE EXCEPTION OF NUMBER 11, SEPTEMBER 1944, HAVE BEEN SENT TO DEAN BLAKE. THE EDITORS WOULD APPRECIATE RECEIVING SEVERAL COPIES OF THE SEPTEMBER 1944 BULLETIN. SEVERAL ORGANIZATIONS HAVE REQUESTED COMPLETE FILES OF OUR PUBLICATION AND THE SUPPLY OF THE SEPTEMBER 1944 ISSUE IS EXHAUSTED.

Sirs: The writer has just read with much interest Volume 2, Number 3 of THE BULLETIN of the American Society of Hospital Pharmacists. Congratulations are in order. In the writer's opinion the compilation is good and the articles are definitely informative.The writer looks forward to perusing future copies of your publication.

Vincent A. Burgher
Vice-President
Ciba Pharmaceutical Products
Summit, New Jersey

Sirs: May I add my congratulations to those which are coming to you on the improvement of THE BULLETIN of the Society. You have certainly put new life into the publication and it is indeed a splendid job in every respect.

Estelle Kisonas
West Jersey Homeopathic Hospital
Camden, New Jersey

EDITORIAL

Dinner, cocktails, a motion picture or a speaker, all arranged and contributed month after month by the same or a different pharmaceutical house is the constant pattern for programs of a few hospital pharmacists' organizations.

A constant repetition of this type of meeting defeats the purpose for which professional societies are formed. It leads to a stagnation of individual initiative and induces a mental inertia in which the individual becomes a passive member of an audience instead of an active participant in a program.

We wish in no way to imply a censure of pharmaceutical houses for their co-operation in arranging programs for the benefit of hospital pharmacists. These organizations are undoubtedly trying to be helpful, and we appreciate the planning of suitable projects involves considerable time and expense. Nor do we wish to imply that such programs are undesirable. We believe they do have a very definite place in the activity of a hospital pharmacy group. However, we do believe it a mistake to have a constant repetition of this type of meeting, as is customary with some hospital pharmacists' associations. It is the responsibility of the program committee to arrange a well balanced series of meetings for the year.

The program committee is the key to the success of any organization. If the programs are interesting and varied, pharmacists will attend; if they are dull and uninteresting, enthusiasm will be lost and attendance will drop. It is indeed a difficult task requiring considerable thought and attention to outline and to effect a program for a series of interesting meetings.

There are a multitude of problems in hospital pharmacy concerning which there is little agreement or written knowledge. These problems may serve as proper topics for a program since they are vital to the success, not only of the pharmacy department, but also to the success and progress of the individual pharmacist. In the final analysis the majority of meetings should be devoted to a discussion of topics which will make it possible for the attending pharmacist to return to his department and put into practice some of the ideas he has gained through contact with his fellow hospital pharmacist.

Let us consider some programs of practical value. One would be a discussion of manufacturing records and their value in the management of the department and in demonstrating to the administrator the savings effected by the department. This may sound like a dry topic. However, I believe it may be correctly stated that those hospital pharmacists who keep good manufacturing records and use them are much better paid than those who do not. A discussion of manufacturing records leads naturally to a discussion of what use to make of the records after they have been compiled. This question leads to a consideration of the value of an annual report to be submitted to the administrator. Several meetings may be devoted to a discussion of the preparation of parenteral fluids. This subject is an ideal one to be handled as a symposium with several speakers, each discussing various phases of the general subject. Other program topics might be: Pharmacy Policy, Pharmacy and Therapeutics Committee, Hospital Formularies, Narcotic Control, Purchasing Records, and the many specific problems of manufacturing that daily confront the hospital pharmacist.

Injections For Acidosis

By Don E. Francke

Three preparations of particular interest to the hospital pharmacist are Sodium R-Lactate Injection, Sodium R-Lactate Ringers Injection, and Sodium Bicarbonate Injection used for the treatment of acidosis. These preparations are of special interest to the hospital pharmacist for they seldom are administered to any except the hospitalized patient. The hospital pharmacist should be familiar with the indications, actions, calculation of dose, and the methods of preparation and assay of these injections. Both Sodium R-Lactate and Sodium R-Lactate Ringers Injections have been tentatively approved for admission to U.S.P. XIII. As yet there is no official preparation of Sodium Bicarbonate Injection. It may be reasonably expected that the adoption of these preparations by the U.S.P. will greatly increase the use of injections for the treatment of acidosis.

A C I D O S I S

Normally the reaction of the blood is protected by a series of buffers so that there is little change in the pH of the blood. It is the combination of the sodium ion with a weak acid, for example carbonic acid to form sodium bicarbonate, that makes up the so-called "alkali reserve" of the body. The alkali reserve represents the amount of available alkali for the neutralization of stronger acids. Acidosis occurs when strong acids - such as beta-hydroxybutyric in diabetis or phosphoric and sulfuric acids from the oxidation of sulfur and phosphorus containing proteins combine with the sodium of the sodium bicarbonate and release carbon dioxide which is then driven off by the lungs. The result is a reduction in the amount of protective alkali in the blood for the maintenance of its reaction. This condition of reduced alkali reserve is known as acidosis. There are varying degrees of acidosis, expressed as the carbon dioxide combining power of the plasma in volumes per cent, representing the amount of bicarbonate in the blood. The normal carbon dioxide combining range is 50 to 70 volumes per cent. A value of 40 to 50 represents moderate acidosis, while a value of 30 represents severe acidosis. At a value of 15, coma is either imminent or present. The carbon dioxide combining value is used to calculate the amount of alkali - sodium lactate or sodium bicarbonate - required to restore the alkaline reserve to normal.

NORMAL DEFENSE REACTIONS OF THE BODY

The body possesses three principal mechanisms to help maintain the normal pH of the blood. When acidosis threatens, the lungs drive off carbon dioxide formed by the decomposition of body bicarbonate and thus tends to preserve the normal ratio $NaHCO_3/H_2CO_3$ and to maintain the normal pH of the blood. The kidneys excrete phosphoric and sulfuric acids formed by the metabolism of proteins and the hydroxybutyric acid formed in diabetis, thus tending to reduce acid retention. However, the buffer systems of the blood and tissue are the most important mechanisms for the protection of the reaction of the blood for they instantly neutralize invading acids with scarcely any change in pH.

B U F F E R S

The pH of the blood is held within narrow limits by a series of buffers. These include the alkali salts of bicarbonates, phosphates and proteins of which the alkali bicarbonates are of principal importance. In each system part of the buffer is present as the free acid, while part of it is present as the salt of the weak acid with a strong base. The pH of the blood depends mainly on the ratio of the buffer system $NaHCO_3/H_2CO_3$. In normal blood plasma this ratio is 20/1 with the resultant pH of 7.4.

It will be recalled that buffers have the power of neutralizing relatively large amounts of either acid or base without an appreciable change in pH. The body buffers keep the pH of the blood within normal limits by this mechanism. For instance, if hydrochloric acid is added to the bicarbonate of the buffer system, the effect is to replace the strong acid, hydrochloric, with an equivalent of a weak acid, carbonic, so that there is but a slight shift in pH.

$$NaHCO_3 + HCL = NaCl + H_2CO_3$$

When an alkali is added to the buffer system the same mechanism obtains; the strong alkali, sodium hydroxide, is replaced by the weak alkali, sodium bicarbonate.

$$NaOH + H_2CO_3 = NaHCO_3 + H_2O$$

The effect of buffer action is that the resulting change in pH upon the addition of an acid or an alkali is only a small fraction of what it would be if these substances were added to an unbuffered system. The fact that body buffers are capable of neutralizing approximately 1000 cc. of normal acid before being depleted illustrates the tremendous capacity of the buffer system.

CAUSES OF ACIDOSIS

Acidosis may be produced by several mechanisms. It may occur following excessive production of acids within the body. This type occurs in the acidosis of diabetis mellitus when, due to the inability of the body to metabolize carbohydrates, increasingly large amounts of fats are broken down with the formation of the so-called ketone bodies, betahydroxybutyric and diacetic acids and acetone. Excessive production of acids within the body occurs in other conditions in which the supply of carbohydrate is deficient, as in starvation, pernicious vomiting, the cyclic vomiting of childhood and in cases of poor absorption of carbohydrates from the intestine.

Acidosis may result due to a defective elimination of acids normally produced. Examples of this type of acidosis are the acidosis of phosphoric and sulfuric acid retention as occurs in nephritis, and the retention of carbon dioxide which occurs in conditions of poor blood supply to the lungs, as in pulmonary edema and morphine poisoning. The ingestion of acids, or of acid-forming salts, such as ammonium chloride, may cause acidosis.

Acidosis may also be produced by a loss of alkali from the body such as occurs in severe diarrhea. When alkali is lost from the body the result is to deplete the alkali reserve. Thus acidosis may be due to either excess acids or a loss of alkali, both resulting in a lowered alkaline reserve.

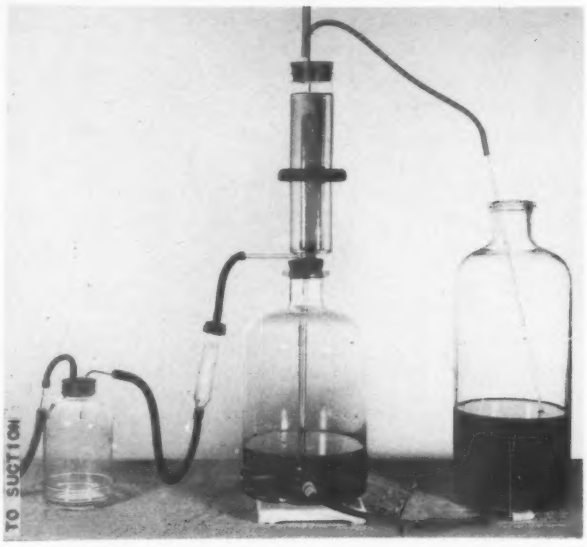
PREPARATIONS FOR TREATMENT

Sodium r-lactate or sodium bicarbonate are the alkalis usually used in the treatment of acidosis. Others, such as sodium citrate of sodium acetate may also be used, citrates and acetates being converted in the body to bicarbonates.

When the plasma carbon dioxide combining power falls to 40 or below the administration of calculated amounts of sodium bicarbonate or sodium r-lactate will restore the depleted alkali reserve to normal and thus overcome the symptoms of acidosis. In mild cases the alkali may be administered orally; however, when the need is urgent the intravenous injection of an isotonic solution is indicated.

Acidosis is often accompanied by dehydration in which large amounts of the fixed bases, sodium, potassium and calcium are lost. In such cases it is desirable to restore the lost body fluids and bases by the administration of isotonic sodium chloride solution or the more physiologically balanced Ringers solution. The re-

sult of the administration of these fluids is to restore blood volume and indirectly, to improve circulation and renal activity. For this purpose Sodium R-Lactate Ringers Injection or Sodium Bicarbonate Injection in combination with physiological saline injection may be used. Sodium bicarbonate, however, is incompatible with Ringers solution because sodium bicarbonate precipitates calcium hydroxide from Ringers solution.



BACTERIAL FILTRATION ASSEMBLY

CALCULATION OF DOSE

Hartmann and Senn II (1932) have suggested a method to calculate the dose of molecular sodium bicarbonate or sodium lactate required to increase the carbon dioxide content of body fluids to a normal value of 60 volumes per cent.

Dose in mM = (60 - plasma CO_2 content) x 0.3 W

mM = millimols of sodium bicarbonate or sodium lactate.

W = body weight in kilograms

1 mM of sodium bicarbonate = 0.084 Gm, or 1.5 cc of 5.6% solution, or 6.0 cc of 1.4% (isotonic) solution.

1 mM of sodium lactate = 1 cc of molar sodium lactate solution, or 0.333 cc of 20/6 molar solution or, 6.0 cc of 1/6 molar (isotonic) solution.

When the carbon dioxide content of the serum is unknown, it is safe to give five millimols, 30 cc of isotonic sodium lactate or sodium bicarbonate per kilogram of body weight.

METABOLISM OF SODIUM R-LACTATE

The body daily produces large amounts of l(+) lactic acid as a by-product of muscular contraction. This acid is oxidized by the body or converted to glycogen. Sodium R-Lactate Injection, a racemic mixture, contains approximately equal proportions of l(+) sodium lactate and l(-) lactate. Upon injection l(+) lactate is converted to glycogen; while the l(-) lactate is converted to sodium bicarbonate. The racemic mixture is almost completely metabolized in from one to two hours. It is, of course, the conversion of l(-) lactate to sodium bicarbonate which makes Sodium R-Lactate Injection valuable in the treatment of acidosis. This relatively slow conversion into sodium bicarbonate which permits the buffer system to adjust itself gradually and without danger of uncompensated alkalosis, constitutes the principal advantage of sodium r-lactate over sodium bicarbonate.

PREPARATION OF SODIUM R-LACTATE INJECTION

Sodium r-lactate injections may be prepared according to the method of Hartmann and Senn I(1932). The finished solution may be the isotonic 1/6 molar (1.87% W/V) solution ready to inject, or as a concentrate to be diluted with Ringers solution or distilled water before injection. In either case sodium r-lactate is prepared by neutralizing lactic acid U.S.P. with concentrated sodium hydroxide solution using phenol red as an indicator. Since lactic acid contains a considerable amount of anhydride it should be diluted with water before neutralization; and it must be boiled for approximately an hour

to insure the hydrolysis and neutralization of the anhydride, alkali being added in slight excess during the boiling process. The phenol red indicator indicates the point of slight excess.

The following is a formula for the preparation of a Sodium R-Lactate Injection 20/6 molar. Before administration 50 cc. of this solution is added to 950 cc. of sterile distilled water or Ringers solution to make a liter of 1/6 molar solution.

Acid lactic U.S.P.	1176.0 cc.
Sodium hydroxide CP pellets	533.0 Gm.
Phenol red solution 6 mg/cc.	1.0 cc.
Recently distilled water	4000.0 cc.

Dissolve the sodium hydroxide in 2000 cc of freshly distilled water in a six-liter erlenmeyer flask. Slowly add the lactic acid and mix well. Add the phenol red indicator. The color of the solution at this point will be a deep purplish red. Actively boil the solution for approximately an hour. If the color changes to a yellowish peach, add a small amount of sodium hydroxide to bring the pH to 8.0 according to phenol red color standards. When hydrolysis is complete, cool and transfer the solution to a graduated container. Make up to the required volume with recently distilled water. Filter the solution through a Berkefeld candle into an aspirating bottle and fill into 50 cc pyrex screw cap bottles. Sterilize in the autoclave at 121' C. (15# pressure) for 20 minutes.

LaMotte phenol red standards with a pH range of 6.8 to 8.4 are most useful in following the pH changes in the preparation of both sodium lactate and sodium bicarbonate, (LaMotte Chemical Products Company, Baltimore, set of nine standards, approximate cost $5.00 per set)

A convenient source of phenol red (phenolsulfonphthalein) solution 6 mg per cc is the commercially available ampule used for kidney function test.

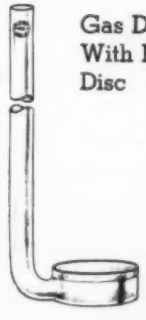
ASSAY OF SODIUM R-LACTATE INJECTION

Sodium R-Lactate Injection 20/6 molar may be diluted to 1/6 molar with distilled water and assayed according to the method included in New and Nonofficial Remedies (1944). "Transfer exactly 10 cc. of sodium r-lactate solution to a platinum crucible and evaporate to dryness. Heat the residue gently and then gradually raise the temperature until the salt is carbonized, but do not exceed a dull red heat. Cool the mass and moisten with a drop of distilled water. Again heat to redness and repeat the procedure until the residue is white. Transfer the cooled crucible and its contents to a beaker and dissolve the residue in 50 cc. of water. Titrate with tenth-normal acid, using methyl orange as an indicator: not more than 17.2 nor less than 16.5 cc. of tenth-normal acid is required."

SODIUM BICARBONATE

Sodium bicarbonate is usually prepared as a hypertonic solution which may be injected as such, or may be diluted with sterile distilled water or physiological saline. Ringers solution cannot be used as a diluent because sodium bicarbonate causes a precipitation of calcium hydroxide from Ringers solution. A convenient strength to prepare sodium hydroxide solution for injection is 5.6 per cent. This solution may be readily diluted with three volumes of sterile distilled water to make a 1.4 per cent solution which is isotonic. The indications for sodium bicarbonate in acidosis are the same as those of sodium lactate. Sodium bicarbonate is much more rapid in action and is considered superior to sodium lactate in cases in which sodium lactate metabolism is seriously impaired.

PREPARATION OF SODIUM BICARBONATE INJECTION

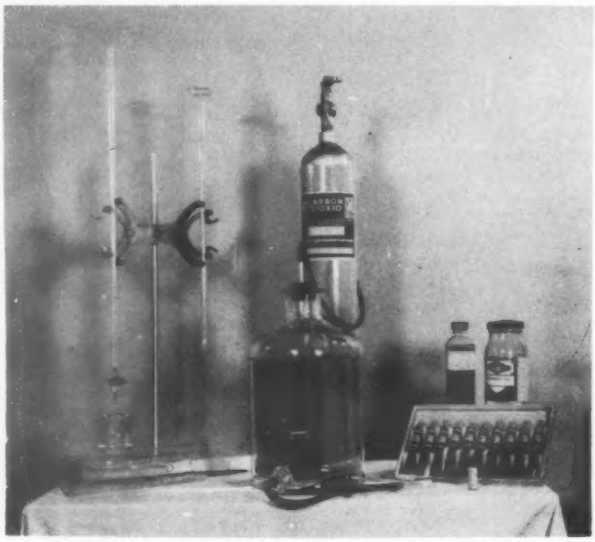


The principal difficulty to be overcome in the preparation of Sodium Bicarbonate Injection is due to the conversion of sodium bicarbonate to the more alkaline sodium carbonate upon sterilization, with a loss

of carbon dioxide. Holmes and Cullen (1937) have suggested a method to obviate this difficulty. The filtered sodium bicarbonate solution is saturated with carbon dioxide, using phenol red as an indicator, and sterilized in tightly sealed containers. A suggested formula and procedure is as follows:

	Gm/cc
Sodium bicarbonate A.R.	224
Phenol red solution 6 mg/cc	1
Recently distilled water, to make	4000

Prepare a solution of the listed ingredients. Filter through a Berkefeld filter into an aspirating bottle. Attach gas dispersion tube with fritted disc (Corning Glass Works Pyrex Catalogue number 39525, HEGUW, cost $3.) to the aspirating bottle. Insert dispersion tube through a two hole rubber stopper, the other hole of which is stoppered with cotton to provide for a slow release of carbon dioxide from the aspirating bottle. The dispersion tube is then connected by means of rubber tubing to a tank of carbon dioxide and the gas is bubbled slowly through the solution. As the solution becomes saturated with the gas, the indicator assumes a yellowish peach color indicating a pH of 7.0 to 7.2.



SATURATING SODIUM BICARBONATE SOLUTION WITH CARBON DIOXIDE

After the sodium bicarbonate solution is saturated with carbon dioxide it may be transferred to appropriate containers. If the carbon dioxide is allowed to bubble through the solution as the bottles are filled from the aspirating bottle the carbon dioxide content of the solution will be held constant and the bottles may be more rapidly filled. Any bottle with a tight seal may be used for the sterilization of the finished solution; pyrex glass containers are preferable, a 250 cc pyrex bottle is available (Corning Glass Works Pyrex catalogue designation, water sample bottle* 720, approximate cost 35 cents each). Serum bottles with a rubber-diaphram stopper with sleeve may be used with a vial holder similar to that described on page 79, volume 2 of this publication to hold the stopper in place during the sterilization process. Glass ampules may also be used.

The bottled solution is autoclaved at 121° C (15# pressure) for 20 minutes. After sterilization the pressure should be allowed to return slowly to atmospheric in order to prevent loss of carbon dioxide from the solution. The sterilized solution should have a pH of between 7 and 8 as indicated by the phenol red color standards.

Cunningham and Darrow (1931) have suggested another method of preparing sodium bicarbonate solutions. By their method, previously sterilized sodium bicarbonate is partially neutralized with hydrochloric acid with the formation of sodium bicarbonate and sodium chloride. The principal disadvantage of this method, as presented, is that the solution must be prepared just prior to injection.

ASSAY OF SODIUM BICARBONATE INJECTION

Transfer 50 cc of the sodium bicarbonate solution to a 250 cc conical flask. Add three or four drops of methyl orange indicator and titrate the solution with normal sulfuric acid. Each cc of normal sulfuric acid required is equivalent to 0.08402 Gm. of sodium bicarbonate. The solution should contain not less than 95 per cent and not more than 105 per cent of the theoretical amount of sodium bicarbonate.

* Tightly fitting rubber-lined plastic screw caps are available for this bottle.

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POSITIONS IN HOSPITAL PHARMACY

DUKE UNIVERSITY HOSPITAL, a 550 bed general teaching hospital, located at Durham, North Carolina has positions open on its staff for several hospital pharmacists. Please write to Chief Pharmacist I.Thomas Reamer.

CLEVELAND CITY HOSPITAL, a 1600 bed institution, has an opening on its staff for a capable hospital pharmacist. For futher information please contact Chief Pharmacist P.J.Hanley, 3395 Scranton Road, Cleveland.

VETERANS of the armed services who are graduate pharmacists interested in entering the field of hospital pharmacy are invited to contact prospective employers through the columns of THE BULLETIN. Write the Editor giving age, educational background, previous experience and locality desired. No charge.

JAMES WALKER MEMORIAL HOSPITAL located in Wilmington, North Carolina would like to employ a pharmacist to organize a pharmacy department. Interested pharmacists are requested to contact Assistant Superintendent George R.Darden.

MERCY HOSPITAL, a 150 bed general hospital, would like to employ an additional pharmacist for its staff. For further information please contact Chief Pharmacist Wilma K.Ma[illegible], Council Bluffs, Iowa.

SAINT MARYS HOSPITAL would like to employ a pharmacist, perferably a woman. Saint Marys hospital is a 820 bed institution located in Rochester, Minnesota. For additional information please write to Sister M.Domitilla, Superintendent.

UNIVERSITY OF CALIFORNIA HOSPITAL PHARMACY

By James P. Jones
Chief Pharmacist

The hospital pharmacy is on the ground floor of the university clinic building. The clinic and hospital are part of the University Medical Center in San Francisco; this center includes the College of Pharmacy, College of Medicine, College of Dentistry and College of Nursing. The Hooper Research Foundation and the Langley Porter Clinic (a psychiatric hospital and clinic) are also on this campus. All of these University Departments and a few of the Departments in the University at Berkeley, California, requisition certain supplies from the hospital pharmacy.

A VIEW OF THE COMPOUNDING CASE

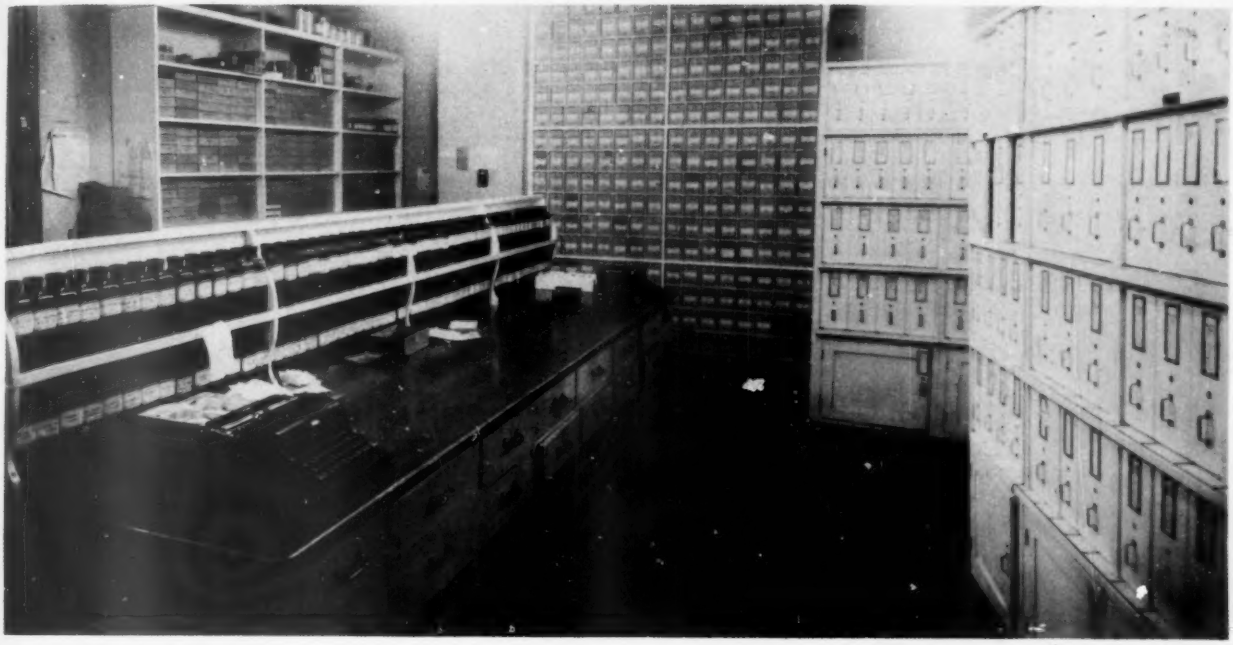
The hospital pharmacy occupies a floor space of 2427 square feet and the manufacturing laboratory situated on the ground floor of the College of Pharmacy building occupies 2000 square feet. Thus, 4427 square feet is the floor space used at present to give pharmacy service primarily to the hospital of about 300 beds and 30 bassinets and the clinic which has from 100,000 to 170,000 clinic visits per year.

The pharmacy is open from 8:00 A.M. to 6:00 P.M. on week days and from 9:00 A.M. to 1:00 P.M. on Sunday and holidays. One pharmacist is always available for emergency calls at night.

The pharmacy service is rendered by eight pharmacists including the chief pharmacist; two typist-clerks, three technicians, a half-time cashier, and two pharmacy helpers in the pharmacy proper and a pharmacist, a technician and several part time pharmacy students in the manufacturing laboratory. The manufacturing laboratory is also used for instructing college students in large scale manufacturing techniques. The pharmacy normally has from two to four pharmacy interns; however, the present high drug store salaries and a shortage of pharmacy students have deterred suitable applicants from choosing this specialization.

The hospital pharmacy last year filled 74,000 out-patient prescriptions and the equivalent of 86,500 prescriptions as in-patient prescriptions and other departmental and ward requisitioned items. The preparation of parenteral solutions and their administration sets has been averaging about 1500 of each per month. The pharmacy also prepares the blood transfusion and plasma administration sets as well as providing an administrative control of the blood bank service between the hospital and the Irwin Memorial Blood Bank. Approximately 200 units of whole blood and 100 units of frozen plasma are used per month.

Our manufacturing department last year made sixty tablet, seven capsule, twenty-one ointment, nine powder, three soap, four suppository, ten x-ray and photographic solution and forty-four liquid formulae. These totaled: 1,427,303



A VIEW OF THE PRESCRIPTION CASE, SCHWARTZ CABINETS, AND PRESCRIPTION FILES

tablets, 12,000 capsules, 312.8 kilograms of ointments, 178 kilograms of powders, 3780 gallons of soaps, 2050 suppositories, 2753 gallons of x-ray and photographic solutions, and 5951 gallons of liquids.

The pharmacy has several pieces of equipment in addition to those which are usually thought of as the basic instruments of pharmacy. We would like to mention especially a large refrigerator of about 35 cubic feet capacity, a Coleman model "A" pH meter, four typewriters, a dictaphone and transcribing machine, a small capsule filling machine, a small tablet counting machine, a cash register, a purity meter for checking the distilled water, a semi-automatic syringe type measuring device for filling serum vials of 5 cc to 30 cc. capacity and a machine for applying aluminum seals to the serum vials in the same manner used today to seal vials of penicillin. The tightly sealed serum vials can then be autoclaved without blowing the rubber diaphragm stoppers. We also have a water still with a capacity of 25 gallons per hour, an autoclave, an electric air pressure and vacuum pump, a bottle washer and the semi-automatic Fenwal measuring and filling equipment for filling Fenwal parenteral solution flasks.

Our manufacturing laboratory has two tablet machines, a small coating pan and a polishing pan for tablets, a granulating machine, a dryer, two steam kettles, two colloid mills, two ointment mills, a ball mill, three glass lined tanks, two capsule filling machines, one capsule and tablet counting and packaging machine, a bottle filler, a pressure filter, two ointment tubing machines, a powder mixer, several large percolators, and other miscellaneous pieces of equipment.

Supplies are purchased through a central university purchasing department and dispatched to the department from a central campus receiving department and storeroom. The bills are routed through the hospital's central accounting department which also handles all pharmacy charges.

We also have a hospital formulary and handbook which was compiled by the hospital pharmacy committee. This committee is composed of the heads of the various departments and has as chairman, the dean of the College of Pharmacy, and as secretary, the chief pharmacist.

The hospital pharmacy will be enlarged and relocated on the first floor of the clinic when the post war plan for an additional 500 bed hospital is accomplished.

CURRENT LITERATURE OF HOSPITAL PHARMACY

HOSPITAL MANAGEMENT (June, 1945)

"Is Your Hospital Making Maximum Use of the Pharmacist?" by Edward Spease, formerly Dean of the School of Pharmacy, Western Reserve University - Professional items should be segregated from general store items and under the supervision of a pharmacist. This will result in better care for the patient and economy to the hospital. page 97

"Little Immediate Improvement Seen in Pharmaceutical Supplies" - Even though the policy of the War Production Board has eased, there will be little immediate improvement in meeting drug and pharmaceutical industry requirements. page 102

"A Hospital Pharmacist's Diary by Paul Cole, Chief Pharmacist, Michael Reese Hospital, Chicago - Surveys the hospital scene. page 106

HOSPITAL MANAGEMENT (July, 1945)

"Pharmacy Internship Sequel Explains Misinterpretation" - An explanation of the article "A New Danger to Public Health" which was reprinted in the April, 1945 issue of Hospital Management. page 100

"What Steps Should be Taken To Insure A Well-Organized Pharmacy?" - A list of rules governing the hospital pharmacy at Miami Valley Hospital, Dayton, Ohio is given. The regulations cover requisitioning of drugs, emergency drug supply, and narcotic count record. page 95

MODERN HOSPITAL (July, 1945)

"Clinical Uses of Curare" by Edgar T. Beddingfield, Department of Pharmacology, University of North Carolina - The uses of Curare as a therapeutic agent. page 89

SOUTHERN HOSPITALS (July, 1945)

"Hospital Pharmacies in the United States Navy" - The training and duties of the navy pharmacists. page 80

"With the Hospital Pharmacist" by D. O. McClusky, Jr. - News items of interest to hospital pharmacists including an article on "Refresher Course in Pharmacy Offered Ex-Service Men" as is being offered at Watts Hospital, Durham, North Carolina. page 78

SOUTHERN HOSPITALS (August, 1945)

"Kweiyang Central Hospital Pharmacy" by John Kuo Chieh Liu, Chief Pharmacist, Kweiyang Central Hospital, Kweichow, China. - A description of Kweiyang Hospital and the work carried on there. page 82

"Did you know that... " by John J. Zugich - A monthly column consisting of items of interest from technical and professional literature. page 78

AMERICAN PROFESSIONAL PHARMACIST (June, 1945)

"Helpers In A State Hospital Pharmacy" by Ernest Royce, Pharmacist, Napes State Hospital, Imola, California - How a pharmacist used patient help in a state hospital for the insane. He also relates experiences with the helpers. page 536

AMERICAN PROFESSIONAL PHARMACIST (July, 1945)

"A Method of Buying in a Hospital Pharmacy" by Sr. Cuthberta, R.Ph., St. Mary's Hospital, Minneapolis, Minnesota - How the hospital pharmacist can control stock when he has the responsibility of purchasing for the pharmacy and the central supply unit. The method used at St. Mary's Hospital is given. page 634

concluded on page 118

THE TECHNIC OF *Technical Writing*

By John Bakeless*

Writing articles and reports is one of those tasks that sooner or later almost everyone has to face. It is not quite as inevitable as the proverbial "death and taxes," but it is reasonably certain that no one will go very far in any of the scientific professions without meeting the urge to take pen in hand.

Yet, in spite of this obvious fact, it is practically impossible for a beginner to get practical hints on technical writing. The beginning writer of scientific articles, therefore, either plunges in untaught, only to give up in discouragement, or else struggles for years to learn by the tedious method of trial and error a few of the more obvious things that any veteran scribbler could have pointed out in half an hour. This article is intended to replace that half hour.

COLLECTING AND CLASSIFYING

The first thing any technical writer needs to know is the purely mechanical side of collecting and classifying materials. If a study is at all detailed, it is quite impossible to write without notes of some kind. It would save endless trouble if every professional school would teach as much about note-taking as is contained in elementary treatises like Dow's Principles of a Note-System for Historical Studies[1] or Spahr and Swenson's Methods and Status of Scientific Research.[2] In spite of their rather forbidding titles, both are extremely readable books.

Methods of note-taking differ from writer to writer. For some twenty-odd years, I have myself used a card index system of note-taking, and still regard it as probably the simplest, safest, and best way of keeping track of ideas ever invented.

The basis of the system is a five by eight card of ordinary stiff paper or library Bristol board, with or without lines. Bookstores, stationers, and dime stores keep these in stock or can get them on demand. The cards with lines on them, as usually supplied, are distinctly convenient to use with pencil or pen, but they are too stiff to go into a typewriter easily, and are both bulky and expensive if one is engaged in a study that requires large masses of materials. Personally, I much prefer to have a friendly printer cut me a thousand sheets or so of the five by eight size in good stiff bond paper. These are nearly as easy to handle as cards; they are a great deal cheaper; they go into a typewriter much better; and if one is engaged in a great deal of research over a period of many years, the resultant mountain of notes is much smaller because the sheets are thinner. The paper must be stiff enough to file easily and should be of good quality, because the cheaper papers crumble quickly and one's notes are lost.

On these five by eight sheets go the first materials of a new book or a new article--statistical matter, quotations, apt illustrations, laboratory notes, extracts from books and articles, ideas, and bright turns of phrasing of one's own if the Lord is good enough to send any.

(It is never safe, by the way, to trust the memory with either bright ideas or clever phrases. They pass through the mind and vanish, leaving the writer only with the irritating recollection that he has lost something valuable, though he doesn't know quite what. It is regrettably

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true that when one does write down these verbal gems, they usually turn out in the morning to be commonplace; but at least one has them. One can throw away the bad ones and polish up the good ones.)

Printed materials will go into the five by eight file quite as well as one's own notes. Small clippings are best pasted on cards, classified like the written notes, and placed with them. Where there are large masses of clippings, it is better to get five by eight manila envelopes, put clippings dealing with the same subjects together, and classify the envelopes exactly as if they were cards. When an envelope is overfull, it is always easy to start another in the same classification.

Pamphlet material presents a special problem--especially the innumerable reprints of articles from technical journals that accumulate as one gets deeper into a subject. These are usually too large to fit into the five by eight file; but it is always easy to file them separately in old typewriting paper boxes, appropriately labeled with classifications corresponding to the main file. Personally, I like to keep my pamphlet boxes on the book shelves among books dealing with the same subject.

The main danger of note systems is that one may become swamped under their mere volume. A classification system is therefore needed. It must not be very complicated in itself, otherwise one gives up writing to attend to the note system; and yet it must be detailed enough to produce a note when wanted, otherwise notes are lost in the file forever.

I find that a few simple guide headings at the top of each card are all one needs. In making notes, leave a margin of at least half an inch along the eight-inch side. When the note is dropped into the filing box, this edge is placed at the top. On the left corner is written the name of the particular study in which the note is to be used--a matter of special importance if, as usually happens, one is carrying forward several studies at once. In the middle of the blank space is written the chapter of the new book or section of the article to which it belongs. In the extreme right hand corner a further subsection or subdivision is indicated.

On the desk beside me at this moment, for example, is a box of notes for a biographical study on which I have been working for the last year or so. The label on one of my guide-cards reads "Predecessors"--meaning the explorers who more or less anticipated the work of my subject. In the right-hand corner is the name of one such individual. Any further notes dealing with that particular pioneer will be similarly labeled and placed next this card. When I am ready to write a paragraph on him, I shall have all my materials together; and I shall know exactly where and how they fit into the structure of the new chapter. The card also carries at the bottom specific reference to the historical manuscript from which the note comes and the library in which the manuscript is preserved.

D O C U M E N T A T I O N

It is always important to know where your facts come from, not only because that is essential to scholarly work, but also because readers have a horrible habit of writing to an author years after an article has appeared, to ask what justification he has for this statement or that. I can testify from painful experience that an author feels pretty foolish when, as occasionally happens, he has to reply that he knew once, but has long since forgotten.

Frequently one takes laboratory notes, or jots down ideas, or copies extracts from books or journals without having any very clear idea just where or how to use them. Practically every study begins with notes taken in just that foggy state of mind; for every subject becomes clear in the writer's own mind only after he has worked on it for a while. In such cases, one makes the notes and indicates their sources, leaving space at the top of the card where classification headings can be put in later. The cards are simply dropped into the file unclassified. It is astonishing to see, as the study goes forward,

how these chaotic masses of data eventually arrange themselves around logical headings as further research clears up the researcher's mind.

There is, to be sure, no special magic in this system; but it is effective, inexpensive, and simple though not too simple. The distinguished Pulitzer prize-winner who takes his notes by tearing sheets of typewriting paper into four pieces and then trying to remember where he put them, has perhaps simplified his note system too far!

None of this requires elaborate or impressive equipment. I wrote my own first book with an old stationery box as card-file, and, though I trust my work has somewhat improved in the intervening twenty years, it is certainly not because of the slightly more expensive files in which I now indulge. Excellent metal boxes to fit five by eight cards can be had for a dollar or so; and for those who want them there are more cumbersome and expensive filing cabinets. Still, I know two authors famous for their factual accuracy who keep their extensive note systems in bundles of cards fastened with rubber bands.

Each section should have some kind of guide-card that will stand a little above the rest, so that the required group of notes can be instantly selected.

AND NOW YOU WRITE

Once the material is gathered, the notes classified, and the subject at least partly clear in the writer's mind, there comes the agreeable agony of writing. The first and worst obstacle is the dreadful task of "starting to commence to begin." You are, let us say, thoroughly familiar with your subject. You have been working in the field for a lifetime, or have been gathering special data for months or years. You have promised to write out your results. The dead-line stares you in the face. You sit down at your desk and clutch a pencil despairingly. The first thing you discover is that your mind shies away from the necessity of commencing, like a stubborn colt.

The resistance of the subconscious to any intellectual task is amazing and--after you have learned how to checkmate it--amusing. The secret lies in the famous principle that "the art of literature is the art of applying the seat of the pants to the seat of the chair"--a principle that applies with equal validity to skirts. In other words, stay firmly at your typewriter until you have something to show, no matter how bad it may be. If your copy is bad, it can always be revised; but if you have no copy, you have not even begun. Eventually, as you go on writing, the subject takes hold of you and the problem of what to say and how to say it solves itself. Most people have to write in their odd hours--evenings, Sundays, holidays. Under such conditions the problem of starting always remains, but it grows easier to solve with each piece of completed work.

A few hints as to the physical preparation of manuscript can save the beginner a good deal of trouble. Pen, pencil, or typewriter are equally good, according to one's preference. All the textbooks urge one to make an outline; personally I rarely use an outline more elaborate than will go on a single page. Anything more detailed is likely to be useless because a piece of writing changes so much in the writer's own mind as he goes along. With the structure clearly written down on a single sheet, one can usually produce a first draft which is at least good enough to serve as a basis for revision.

Make a first draft at full speed. Once you have a subject in mind, get it down on paper. There are days when your copy seems so bad you groan as you write it. Never mind, write it down anyhow. There are other days when ideas pour out in what seems, at the moment, a coruscation of brilliance. It isn't, but never mind that either. Write it down, too. The stuff which seemed so bad when you wrote it may be very readable the next morning. The stuff which seemed so brilliant the night before, may be perfectly appalling drivel. It doesn't matter. The first

dreadful hurdle has been taken when the first draft is down in black and white.

REVISIONS

There are various ways of making revision easier. All typewriting should be double-spaced, of course. Triple spacing and wide margins give you extra room for correction. I like to do my own revision with pastepot and shears. Having written the first draft, I go through it carefully, revising with pen and pencil wherever it needs it--usually nearly everywhere.

One revision, of course, is not enough to produce really good work. One should revise over and over again, if possible several days apart, so that in different moods one sees different faults.

The quality of any manuscript is usually improved if one reads it aloud--or, better yet, if one has a friend read it aloud to the author. No other process shows up faults of style quite so quickly. The written criticism of candid friends is also valuable, providing both friend and author can be candid and still remain friends. Most people merely return a script with the comment: "It's fine," and let it go at that. Many others do not know quite how to formulate their criticisms. The easiest way to submit criticisms to an author is to write them out with page and line references. Thus:

Page 3, line 15: Note split infinitive.
P. 4, l. 6: Date wrong.
P. 5, l. 10: Repetitious. You said this before on p.2.
And so on.

Good publishers and good editors do a great deal of this. When the 400-page manuscript of my life of Daniel Boone came back from the publishers for further revision it was accompanied by nearly thirty pages of typewritten suggestions. In other words, the publishers critique was 7.5 per cent as large as the book itself. Practically every one of those criticisms helped me in one way or another, even those I did not accept.

Gradually, after one has revised and re-revised, and revised again, the paper becomes so completely scribbled over, that even the author begins to find it hard reading. That is the time to re-type where re-typing is needed. But there are always long sections of the manuscript where one "got it right" the first time and where there is no need for revision. There are also the places where new material or new ideas have to be inserted. The easiest thing to do is to cut out the illegible parts with scissors, re-type them, and paste the new and legible sections into place. If paragraphs have to be interpolated to let in new ideas, cut the page in two at the right place and paste in the paragraph.

It is always well to do as much retyping as possible with one's own hands. This is tedious, and the saving in stenographic fees is trivial. The reason for doing it is that so many improvements in phrasing "rise under your fingers" as you go along. These would never occur to one without the stimulus provided by the copying.

MAKE A CARBON COPY!

It usually takes the loss of a manuscript or two to make the beginner realize the value of carbon copies. Nothing gets lost or destroyed quite so easily or quite so quickly as manuscripts. James Anthony Froude's housemaid is supposed to have burned up one entire volume of Carlyle's French Revolution in manuscript. Everyone knows how T.E. Lawrence left the first manuscript version of the Seven Pillars of Wisdom in a London tube station and never saw it again. I myself once sent three manuscripts to the same magazine in the same envelope--supposedly sealed. One arrived; two didn't. Months later the postal authorities politely returned the lost scripts, which they said they had found loose in a mail truck!

One should make a duplicate the moment a manuscript begins to represent a heavy investment of labor. That duplicate should be kept in another building, preferably fireproof, as far from the original

as possible. I once had six months of work blown out of the window of a New York apartment by a sudden gust of wind. When last seen the manuscript was a hundred feet above Eleventh Street and sailing steadily toward the Hudson. I never learned where it came down, but everything was all right. I had two other copies safely tucked away.

The physical appearance of a manuscript going to a publisher is mainly a matter of common sense. Anything that is quickly and easily read is satisfactory. This means good thick paper, a fresh ribbon, double spacing, and at least one-inch margins. It permits a very few corrections in pen and ink. Any elaboration beyond this--fancy binding, ribbon, and that kind of thing--merely stamps one as an amateur, and prejudices the editor.

ILLUSTRATIONS

Pictures or drawings are a problem. Where they are an essential part of the manuscript--as is so often the case in scientific articles--they have to be submitted with it. Unluckily, they are very likely to get lost, broken, creased, or soiled. The easiest thing is usually to place them in an envelope and attach them to the manuscript. Captions, explanations, figured keys to anatomical drawings, and the like, should be typed out and pasted to the back of each. Otherwise, the editor is reasonably certain to get the wrong caption under the wrong picture.

Photographs intended for reproduction must, of course, be glossies. Any pictures not from one's own pen or camera compel one to get the owner's permission before using. Otherwise one may be involved in a copyright suit.

HOW TO SEND IT IN

Very large manuscripts should be sent to the editor flat in a large envelope. Express is often cheaper than postage since all manuscripts are paid for at letter rates. The author's name and address go in the upper left hand corner of the first page and the subsequent pages of this manuscript bear the words

Bakeless
Technical Writing--2

Every article ought to go to the editor exactly as the writer wishes it to appear. The kind of author who expects to make his final revisions after seeing proof is the bane of publishing and causes great expense both to himself and to his publisher. When one realizes that it costs fifteen cents to change a comma, after an article is in print, this is easy to understand.

A WORD ON TERMINOLOGY

Scientific writers unfortunately often fail to consider another financial aspect of their work--its possible profit to themselves. A textbook can make as much money as a successful novel—only cook-books can surpass them both. Technical writing for technical journals at best receives a mere "honorarium" and rarely that. One writes them for the love of science, for reputation, for the pure thrill of research. But there is no good reason why some—not by any means all—technical articles should not furnish the basis for sound and reliable popular articles in magazines that pay respectable fees. Professional writers of "feature" articles for the newspapers and magazines habitually examine the technical journals on the look-out for new material. Having found something that looks interesting, they re-write the result of somebody else's years of labor—this time in readable form—and pocket the fee.

The obscurity and dullness which afflicts so many scientific writers is always regrettable and quite frequently needless. Admitting that serious treatment of a technical subject can rarely be made quite so scintillant and amusing as the witticisms of the New Yorker, one may still point out that obscurity is a scientific sin, clarity a scientific

virtue, and that a scientific writer who has failed to be perfectly clear in all respects has failed, from a purely scientific standpoint.

The real answer to this problem--as to most other problems--is logic. If the writer has thought out a subject logically, he will be able to express it clearly. Where there is clarity, obscurity necessarily vanishes and dullness usually departs with it. For dullness is usually due to the needless difficulty the reader encounters in following an author's thought.

Another cause of both obscurity and dullness is the needless use of large words of Greek or Latin origin. These are always attractive to beginners--particularly if they don't know any Latin or any Greek. Indeed, it is probable that as the casual use of jaw-breakers derived from them has increased, the knowledge of classical languages and literatures has declined.

The only justification for elaborate scientific terminology is its precision. Where precision can be obtained in no other way, a scientific writer has to use it; but that is a very different matter from the use of large words in the spirit of a child with a new toy. In manuals and textbooks read only by the specialized readers of these highly specialized books, scientific terminology has almost the precision of a mathematical formula. But often ordinary words are just as exact; and when that is true, they are always to be preferred.

"Tonsillectomy" is in its way a beautiful word and will hold a patient's family spellbound; but after all, it is merely Greek for "tonsil-out-cut," and there are a dozen ways of saying that in plain language. Similarly, "coleopterous larvae" or "dipterous larvae" may show that the writer has studied zoology, but "grubs" and "maggots" are words that will do much better in most cases. And it is silly to talk about "Lobelia cardinalis," when "cardinal flower" is clearer to your reader and twice as vivid.

Anyone looking for a good example of when to use and when not to use elaborate language will find a superb example in the last chapter of the Origin of the Species; and no one is likely to attack the scientific standing of the late Charles Darwin. The limpid simplicity in the sincerely emotional prose of the last few paragraphs of that great book are not nearly so famous as they ought to be, in the history of English letters.

So long as scientific and technical writers insist on the needless use of scientific jargon, the cheap and flip kind of "popularizer" will flourish. The quality of popular articles on science, health, hygiene and medicine would rise enormously if more of the people who really know about such things would go to the trouble of learning how to tell about them.

1. Dow, Earle W.: Century, 1924. Price $1.50
2. Spahr, Walter E. and Swenson, R.J.: Harper, 1930. Price, $4.00.

CURRENT LITERATURE continued from page 112

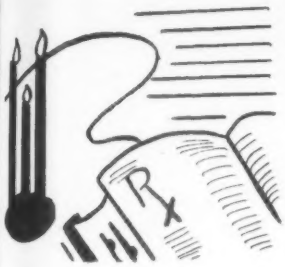
JOURNAL AMERICAN PHARMACEUTICAL ASSOCIATION (July, 1945)

"Convenient Method for Dispensing Laboratory Reagents" by George L. Phillips, University Hospital, Ann Arbor, Michigan - Methods for handling laboratory supplies with illustrations of requisitions used at University Hospital. page 197

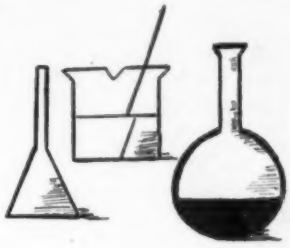
"Retail Pharmacy and The Clinic" - An editorial by Leo F. Godley, American Society of Hospital Pharmacists - The pharmacist in both the retail field and the hospital will gain much from a mutual understanding of the problems in pricing prescriptions for the various classifications of out-patients. page 196

JOURNAL AMERICAN PHARMACEUTICAL ASSOCIATION (August, 1945)

"A Convoy for Hospital Pharmacy" by Howard C. Newton, Dean, Massachusetts College of Pharmacy - The importance of good professional relationship, craftsmanship and showmanship to the hospital pharmacist. page 220



NOTES AND SUGGESTIONS



BACTERIAL FILTRATION APPARATUS

The illustrated assembly is most useful for the bacterial filtration of quantities of two liters or less. Many hospital pharmacists prefer to clarify all parenteral fluids - whether or not the solution is to undergo subsequent heat sterilization - by means of a bacterial filter. In addition to being fairly rapid, bacterial filtration produces a solution which is clear and also bacteria-free. The assembly consists of a Berkefeld-type diatomaceous filter cylinder with glass mantel, a two liter leveling bulb, a small glass bulb filled with cotton, and a safety bottle. The illustrated filter candle is of medium porosity, size 8 by 11 inches. Candles of other porosities and dimensions are available.

The filter cylinder and glass mantel are sterilized as a unit. The same unit may be utilized with any size receptacle, as a two liter leveling bulb, or a four or eight liter aspirating bottle. The metal stem of the Berkefeld-type filter is inserted through the hole in the bottom of the glass mantel. A rubber washer and a metal washer are tightened against the bottom of the mantel by means of a burr. The assembled unit may be wrapped with two thicknesses of heavy paper and sterilized in the autoclave at 120° C. for thirty minutes. The filter candle should be moist before it is autoclaved to insure an even penetration of heat and thus prevent breaking.

The leveling bulb is fitted with a two hole rubber stopper and a glass side arm as shown in the illustration. Heavy paper is placed over the two hole stopper and fastened around the neck of the bulb. The other end of the L shaped glass tube is wrapped with heavy paper or plugged with cotton. Rubber tubing with a glass adapter - a medicine dropper tube is convenient - is fastened to the lower end of the leveling bulb. The adapter is wrapped with heavy paper. The moist assembly is then autoclaved at 120° C. for thirty minutes.

The air filter consists of a glass tube or bulb filled with cotton for the purpose of filtering the air entering the leveling bulb after the suction is disconnected. The illustrated air filter is an Upjohn blood filter assembly unit filled with cotton. The principal advantage of this type of assembly is the removable cap which facilitates the insertion and removal of cotton. Other devises, such as a drip bulb, or 15 mm glass tubing closed at each end with a one hole rubber stopper through which glass tubing is inserted, may also be used.

The safety bottle may be any heavy wall container such as a pyrex flask. The

purpose of the safety bottle is to protect the suction line in case too much fluid is added to the leveling bottle; the fluid enters the safety bottle instead of the suction line. The safety bottle is connected by means of rubber tubing to a source of suction. A convenient source of suction is a filter pump which is attached to a tap water faucet.

To assemble the sterilized units for use, the leveling bulb is placed on a ring stand, the filter assembly is unwrapped and the metal stem of the candle is forced through the paper wrapping of the leveling bulb into the two hole stopper.

SYRUP OF CODEINE AND CHLOROFORM

A pleasant tasting cough syrup is described in the Formulary and Handbook of the Johns Hopkins Hospital. Each 4 cc of the syrup contains 8 mg of codeine phosphate. Syrup of Cherry N.F. may be used in place of Syrup of Wild Cherry, if preferred.

	Gm/cc
Codeine Phosphate	0.25
Spirit of Chloroform	3.00
Glycerin	8.00
Syrup of Wild Cherry, to make	120.00

MILK OF MAGNESIA PASTE

A concentrated Milk of Magnesia paste which when mixed with water produces a product meeting U.S.P. standards is supplied by Whittaker, Clark and Daniels, Inc., 260 West Broadway, New York City. 100 pounds of the Milk of Magnesia paste yields approximately 45 gallons of Milk of Magnesia U.S.P. Complete literature and a sample of the paste may be obtained from the manufacturer.

SUNBURN CREAM

A formula for a protective cream against sunburn has been suggested by Melvin W. Green writing in the BULLETIN of the National Formulary Committee, Volume XIII:111 (May-June) 1945. The ingredients and procedure for preparing the hydrophilic protective cream as developed in the Laboratory of the National Formulary Committee is as follows:

	Gm.
Phenyl Salicylate	5
Ethyl Amino Benzoate	2
Titanium Dioxide	1
Neocalamine	1
Yellow Ferric Oxide	0.1
Coumarin	0.1
White Wax	2
Triethanolamine	0.5
Stearyl Alcohol	8
Stearic Acid	2
Glycerin	10
Distilled Water, a sufficient quantity to make	100

CONSERVATION OF SPACE

Sister Mary John of Mercy Hospital, Toledo, writes the following interesting suggestion:

"As our record room is just around the corner from the pharmacy, and a projector reader is available for reading micro-filmed charts, we decided to empty the bulging prescription files rather than buy new files. We filmed all of the prescriptions which can be refilled up to January 1, 1945. This was done at a cost of less than six dollars for each ten thousand prescriptions, which I think is cheaper than buying new prescription cabinets. One can locate a prescription in a few minutes unless the number wanted is at the beginning of the film".

D.D.T. AVAILABLE

A limited amount of the new insecticide Dichloro-Diphenyl-Trichloroethane has been released by the WPB for civilian use. The chemical is effective against flies, mosquitoes, bedbugs, and other insects and vermin which are a menace to humans, animals and plants. It may be employed as a spray by adding 5 per cent to ordinary fly spray, kerosene, or xylene. As a dusting powder it may be employed in a 10 per cent mixture with talcum powder.

NEWS ITEMS

U.S.PUBLIC HEALTH SERVICE COMMITTEE MEETS

The first meeting of the Committee on Survey of Pharmaceutical Activities in the U.S.Public Health Service was held in Washington July 6 and 7 under the leadership of its chairman Robert P. Fischelis. Attending the meeting were committee members Dr. Troy C. Daniels, University of California School of Pharmacy, Mr. Don E. Francke, University Hospital, Ann Arbor, Michigan, Dr. Ivor Griffith, Philadelphia College of Pharmacy and Science, Mr. Albert P. Lauve, Charity Hospital, New Orleans and Dr. Louis C. Zopf, University of Iowa College of Pharmacy. The committee was appointed by the Council of the American Pharmaceutical Association with the co-operation of Surgeon General Parran of the U.S.Public Health Service.

In Washington the committee met with Assistant Surgeon General R.C. Williams of the U.S. Public Health Service and Miss Mary Switzer, assistant to Federal Security Administrator Paul V. McNutt to discuss problems involved in the survey.

Chairman Fischelis reported the findings of his visits to several U.S.Public Health Service installations and discussed plans to visit additional units of the Service where pharmacists may be utilized. To facilitate the survey, Dr. Fischelis has been commissioned with the grade of Senior Pharmacist, equivalent to the rank of Commander in the Navy or Lieutenant-Colonel in the Army and has been provided with a letter of introduction to the Commanding Officers of the various Marine Hospitals, Public Health Service Hospitals and Quarantine Stations.

The purpose of the survey is to determine whether more extensive and effective use can be made of pharmacists in connection with the various activities of the U.S.Public Health Service. At the initial meeting the committee studied organization charts and functions of the U.S. Public Health Service for the purpose of determining those divisions of the Service that may use additional pharmacists to advantage. Proposed minimum standards for U.S.Public Health Service Hospitals were discussed and the activities of the Service requiring pharmaceutical assistance were reviewed. During the discussion Dr. Fischelis pointed out that the Public Health Service makes considerable use of pharmacists in an administrative capacity, in addition to those used in work strictly pharmaceutical in nature. Proposals were discussed for the possible integration of pharmaceutical activities within the organization of the U.S.Public Health Service.

Two subcommittees were appointed. One is to make recommendations for minimum standards for pharmacies in U.S.Public Health Service Hospitals. This committee is composed of Mr. Don E. Francke, Mr. Albert P. Lauve and Dr. Louis C. Zopf. The other subcommittee, composed of Dr. Ivor Griffith and Dr. Troy C. Daniels, will recommend specific training required for pharmacists in the U.S.Public Health Service.

1945 MEMBERSHIP DUES are now past due, if you have not yet paid yours please do so. Send your fee to Secretary I.Thomas Reamer, Duke University Hospital, Durham, North Carolina.

WHITNEY TO ORTHO PRODUCTS

Harvey A.K.Whitney

Mr. Harvey A.K. Whitney has been appointed as director of Pharmaceutical Research of Ortho Products Incorporated, Linden, New Jersey. Mr. Whitney was one of the founders and the first chairman of the American Society of Hospital Pharmacists and also served with Leo Mossman as editor of THE BULLETIN. He has served as vice-president of the American Pharmaceutical Association and as a member of the Michigan State Board of Pharmacy. During his tenure as chief pharmacist at the University Hospital, Ann Arbor, Mr. Whitney expanded the pharmacy department from a small dispensary to an outstanding manufacturing pharmacy.

NORTH CAROLINA ESTABLISHES HOSPITAL PHARMACY COURSE FOR VETERANS

The University of North Carolina School of Pharmacy, in co-operation with Charlotte Memorial Hospital at Charlotte, Duke University Hospital at Durham, Rex Hospital at Raliegh and Watts Hospital at Durham, has established a course in hospital pharmacy for returning veterans who are graduate pharmacists.

The program will consist of a four-week period of instruction at the University of North Carolina School of Pharmacy and a twelve-month period of laboratory and practical training at one of the mentioned hospitals. The twelve-month period of hospital training may be reduced to six months if the veteran has had sufficient training in hospital pharmacy in the armed services. The cost of the training program will be borne by the Federal Government. Returns from a questionnaire sent North Carolina pharmacists in the armed forces indicated that many were interested in obtaining training in hospital pharmacy.

OAK RIDGE HOSPITAL HAS OUTSTANDING PHARMACY

John J. Zugich

John J.Zugich is chief pharmacist at Oak Ridge Hospital, Oak Ridge Tennessee, home of the atomic bomb.

Starting from a wilderness, Oak Ridge has expanded in less than two years to the fourth largest city in Tennessee with a population of more than 75,000. Since the ultimate in speed was essential, the Government commisioned Roane-Anderson Company to build and operate a municipality to accomodate 75,000 inhabitants. This tremendous task included the provision of homes, public utilities, including transportation, police and fire protection, food, stores, streets and all the multitude of items that go to provide a way of life in a modern American city. Of course, since the health of the people was of prime importance, a modern hospital was constructed.

Less than two years ago Pharmacists John and Margery Zugich were given the task of organizing the pharmacy service to supply a rapidly growing city. John, as chief pharmacist, selected the location of the department, ordered the equipment and supervised its installation, and determined the policy and procedure of the pharmacy. In the short time Mr. Zugich has been in charge, the department has greatly expanded in physical size and increased services have justified the employment of nine pharmacists.

The medical and pharmacy organization at Oak Ridge is probably the greatest demonstration of group medical care in America. The plan at Oak Ridge is one of the few in the Nation where specific controlled data concerning the relationship of Pharmacy to group medical care plans may be obtained. It is a definite demonstration of the great value of Pharmacy in any type of group medical practice. The success of Mr. Zugich in convincing the management of the value of a top-flight pharmacy depart-

ment demonstrates the potentialities of the field of hospital pharmacy to well qualified individuals.

Mr. Zugich has contributed two articles to THE BULLETIN. Because of the strict security control necessary at the time the articles were written we were unable to print either the name or affiliation of the author. Mr. Zugich's first article "An Approach For Pharmacy Under National Health Insurance" appeared in the January-February issue of this publication, It sets forth a practical plan for the integration of Pharmacy under group medicine and is written from data obtained through experience. Ir THE BULLETIN Volume 2:64 (1945) is the article "Monthly Reports Emphasize Value of Pharmacist To Hospital". In his article Mr. Zugich gives many valuable suggestions to aid in convincing the administrator, using the language he understands, of the value of the pharmacist.

SIR ALEXANDER FLEMING, noted British bacteriologist and discoverer of penicillin, has been elected to honorary membership in the corporate body of the Philadelphia College of Pharmacy and Science. Honorary membership in the Philadelphia College is unique, the most recent scientist from abroad to have been so honored being Mne. Curie, of radium fame.

DR. ARTHUR P. WYSS, head of the Department of Pharmacy at the University of Buffalo has been appointed dean of the School of Pharmacy at Western Reserve University, Cleveland. Dr. Wyss was also consulting pharmacist at Meyer Memorial Hospital in Buffalo.

DR. ROY A. BOWERS, associate professor of pharmacy at the University of Kansas, has been named dean of the College of Pharmacy at the University of New Mexico's newly established pharmacy school.

THELMA COBURN, executive secretary of the Alabama Pharmaceutical Association and one of the outstanding womem in Pharmacy, has been awarded the honorary degree of doctor of humanities by the Howard College School of Pharmacy. Thelma Coburn has been an outstanding worker for the advancement of Pharmacy in Alabama.

PHARMACISTS TO STUDY MEDICAL CARE PLANS

The Council of the American Pharmaceutical Association acting jointly with the Executive Committee of the National Association of Retail Druggists has appointed a a committee for the purpose of studying and giving advice on the various plans that may arise in connection with "socialized medicine" and kindred matters so that Pharmacy's interests may be protected. The co-chairmen of the Joint Committee have named the following to serve on the Committee to Study Medical Care Plans: Mr. Charles R. Bohrer, Mr. P.H.Costello, Dr. R.P.Fischelis, Mr. Don E.Francke, Mr.Chauncey Rickard and Dr. Arthur H.Uhl.

JOHN KUO-CHIEH LIU, chief pharmacist at the Kweiyang Cental Hospital, Kweichow, China, is spending several weeks at Charity Hospital, New Orleans observing the organization and technics of the Pharmacy Department under the direction of its chief pharmacist, Albert P. Lauve.

McDONNELL TO SCHERING

John N. McDonnell

Dr. John N. McDonnell, editor of "American Professional Pharmacist" has recently been appointed the director of domestic sales and promotion of Schering Corporation, Bloomfield and Union, New Jersey. He succeeds Arthur F. Peterson, who has resigned.

In addition to being editor of "American Professional Pharmacist" magazine, Dr. McDonnell is a member of the faculty of the Philadelphia College of Pharmacy and Science. For the past four years he has been head of research of the drugs branch of the War Production Board and recently served as national director of civilian penicillin distribution.

ART AND SCIENCE OF THERAPEUTICS

BY A.H. Aaron, M.D.

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It is with a great deal of humility that I come to Philadelphia to speak to you on the therapy of the present moment in the home, should we say, of the great therapeutists of the past.

On reviewing our material we find that the teaching of therapeutics has been relegated to a position that is unworthy of its value to the physician. Today the subject is frequently discontinued at the end of the junior year in many of the medical schools of the country. The discussion of the therapy of disease is at best held during the last five minutes of each medical clinic given in the schools with the hope of the instructor that this will be reviewed elsewhere, or that some other instructor will ultimately discuss treatment with the student.

If you investigate the orders of the interns in your hospitals, you will find almost all are inadequate to the needs of the patient and your desires. The house officer will in all probability, if you order belladonna, permit your peptic ulcer patient to leave the hospital with just about one adequate dose of the drug instead of a sufficient amount to take care of him during a nominal period of, let us say, three weeks for this particular agent. The theory of the practice of medicine and the theory of therapy are closely related. Unfortunately, we have neglected to emphasize the place of therapy.

The survey we made and our conclusions, which I hope to evaluate for you tonight, may be compared with studies done elsewhere in the United States and would indicate that these circumstances prevail in the field of therapeutics throughout the country.

An analysis of the prescriptions written by 13,000 practicing physicians will reveal that 21 per cent dispense exclusively, 36 per cent write prescriptions, and 43 per cent of this group alternate. In other words, these findings may be applied to all of us, whether we dispense, write prescriptions, or combine these methods.

In order to secure our material, our first step was to collect 7000 prescriptions from 70 pharmacies. We sent the members of the junior and senior medical classes to these different pharmacies, and had them collect and bring in the last 100 prescriptions written. We then analyzed these as to their content, dosage, preparations, type and character, and what we thought the doctor might hope to accomplish by their use. We presented all this data to a group of pharmacologists and clinicians. Whenever a question arose, we consulted the standard textbooks, the United States Pharmacopoeia, New and Nonofficial Remedies, and the National Formulary.

The second group, consisting of 3000 prescriptions, came from the written order books of several of our large hospitals. Of these hospitals, two were teaching

institutions, and in both of these private rooms as well as the ward services are represented in our survey.

For the purpose of analysis we could divide the teaching hospital into two parts, the private rooms and the wards. In all the wards of these hospitals, the use of U.S.P., National Formulary, or N.N.R. preparations only are permitted, whereas in the private room group any preparation can be used, such as highly specialized products, sedatives, cough mixtures, etc.

We have found in the study of the efficaciousness of the official products--such as barbital and sodium bromide--used in the wards that the ward patients were as peaceful and quiet as those who were given the highly specialized products administered in the private rooms.

Four hundred products used by physicians in their office practices were also analyzed as to the type and character of the drugs being dispensed. We found that the agents dispensed by the physician, who used his drug-house catalog as a pharmacopeia, contained multiple ingredients. This presents the rather peculiar situation of a product being fitted to a complaint rather than a specific drug to a patient's ailment. However, our prescriptions show that 54 per cent of the products that we use are official, and the remaining 46 per cent are nonofficial.

As to the system of measurements, 68 per cent are prescribed in the apothecaries' system. The metric system is slowly coming into more general use due to its use in the literature and as given in the dosages of serums, vaccines, and other biological products.

The writing of prescriptions in English predominates, which is a great improvement. The only disadvantage is the use of the euphonic names by the drug houses rather than the official terminology, as these euphonic names may cover multiple ingredients, some of which may be toxic in certain individuals, such as cinchophen derivatives or coal tar products. I desire to call your attention to the advantage of using phenobarbital under its official name rather than a trade designation. This will also result in a financial saving to the patient.

PRESCRIPTION

Phenobarbital .03 (½ grain).
M et fit #30 such.
Sig: One at 11 a.m., 4 p.m., and at bedtime.

Today one of the commonest agents taken with suicidal intent is some form of a barbiturate. Many patients are taking so many barbital derivatives to sleep at night that on awaking in the morning they stumble out of bed and are unable to get about readily.

ALKALIS

In our group of prescriptions written for alkalis, the proprietaries outnumbered the officials by a ratio of 22 to 1. This provokes a rather sad commentary when I present the formula of two of these products which contain bicarbonate of soda as one of the principal ingredients.

FORMULA FOR PROPRIETARY POWDER NO. 1
(No proportions available)

Sodium bicarbonate — Bismuth subnitrate
Magnesium carbonate — Oil of Peppermint

FORMULA FOR PROPRIETARY POWDER NO. 2
(Each teaspoonful contains about 60 grains)

12½ gr. free sodium bicarbonate
28 gr. sodium and potassium bicarbonates, as citrates and tartrates
2½ gr. calcium lactate with correct proportions of phosphates, sulfates, magnesium, and 2 per cent chloride

Powders of this character, containing bicarbonate of soda, are too high priced and possess no qualities superior to that of bicarbonate of soda alone.

Sodium bicarbonate, magnesium oxide, and calcium carbonate are the three alkalis most commonly used today. Sodium bicarbonate has not been used in the treatment of gastro-intestinal disease as frequently as in the past because it is one of the alkalosis-producing neutralizers which I will discuss later. It also produces rebound acid values. One of the most efficient alkalis, magnesium oxide, does not

dissolve in the stomach, has a high neutralizing power, does not disintegrate in the intestinal tract, does not cause chloride depletion, and there is less tendency to produce alkalosis. These statements hold true also for calcium carbonate. The only advantage of the magnesium over the calcium carbonate is that it is nonconstipating while calcium carbonate is constipating.

One of the best of the alkaline substances to use in the treatment of peptic ulcer is calcium carbonate, dispensed as:

PRESCRIPTION

Calcium carbonate 0.60 (10 grains).
Dispense 100 such tablets.
Sig: One, 1 hour, 2 hours, and 3 hours p.c.

COMMENT

1. Single ingredient.
2. Excellent neutralizer.
3. Lasts eleven days.
4. Easy to take at work.
5. Inexpensive.
6. Properly timed directions.
7. Less likely to produce alkalemia.
8. Constipating.

The possible occurrence of alkalosis from the administration of alkalis must be borne in mind in the treatment of benign pyloric stenosis, as in this condition there is vomiting, dehydration, loss of essential electrolytes, and nonabsorption of certain chemical substances. Therefore, with a lack of these substances reaching the lower part of the intestinal canal where the acid base equilibrium can be maintained, a patient may develop alkalosis with all its characteristic signs of restlessness, pathologic reflexes, and ultimately, due to a chemical disturbance, coma and death result. It is dangerous to administer the soluble or systemic alkalis to these patients, such as sodium bicarbonate, for they increase the tendency to alkalemia and can cause death.

The treatment of peptic ulcer is based on the theory that control of the acid gastric secretion is desired, and this is accomplished by two means:

1. By an appropriate diet, and the timing of the taking of foods.
2. By the administration of alkalis or adsorbing agents at the definite time intervals when the acid gastric secretion tends to reach the high point.

The adsorbents such as kaolin, charcoal, or aluminum hydroxide could be aptly designated the blotters, as they adsorb, blot up the gastric secretion in the stomach, and in this state the chemical substances are carried into the intestines where they are released. Owing to its action of releasing these chemical substances in the lower intestine, aluminum hydroxide is less likely to produce alkalosis. However, it has one drawback. When administered in conjunction with a nonresidue diet over long periods of time, it adsorbs the fluid contents of the intestine so that it produces not alone constipation but obstipation and fecal impaction. This effect can be partially offset by administering it with mineral oil.

PRESCRIPTION

Aluminum hydroxide 0.60 (10 grains).
Dispense 100 such tablets.
Sig: One, 1 hour, 2 hours, and 3 hours p.c. Mix in ½ glass of water.

COMMENT

1. Single ingredient.
2. Excellent adsorber.
3. Lasts eleven days.
4. Easy to take at work.
5. Expensive
6. Properly timed directions.
7. Partial neutralizer.
8. Obstipation.

Nevertheless, you will find that many patients taking this product will complain of pressure in the rectum, and if they do, do not give them a laxative of any type, as the passing of the scybalous mass will produce tearing of the mucosa of the anal ring. Do a digital examination, and if you find the impacted substance, break it up with a well-lubricated finger. It may be necessary, before this is possible, to instill into the rectum 3 ounces of warm mineral oil and then repeat the digital examination. It should then be possible to break up the mass and its passing will be aided by an enema consisting of one pint of 1/3 peroxide of hydrogen and 2/3 warm water.

Both calcium carbonate and aluminum hydroxide administered in tablet form can be taken by the ambulatory ulcer patient while at work, and thus avoid the difficulties attendant to the use of liquids.

An analysis of the agents used as coaters or protectors of the gastro-intestinal tract, such as bismuth and kaolin, revealed that milk of bismuth was most commonly used. This was administered in inadequate dosage in view of the fact that each teaspoonful of milk of bismuth contains 0.30 or 5 grains of bismuth. In one or two teaspoonful doses used in this manner, inefficient coating or protecting occurs. I should like to designate the bismuth preparations--subgallate, subcarbonate, and subnitrate--as the painters, and if one desires to paint and protect the surface, adequate materials must be used. Milk of bismuth as revealed by x-ray studies does not accomplish this.

The bismuth salts should be administered in the following manner, using any of the preparations mentioned:

PRESCRIPTION

Bismuth Subnitrate ½ lb.
Sig: One heaping teaspoonful in ½ glass of water, between meals and at bedtime. Stir well.

COMMENT

1. Single ingredient.
2. Excellent coater.
3. Adequate amount.
4. Low Cost.

This coating action then is possible when the stomach is nearly or completely empty. X-ray study of it given in this way will reveal efficient coating of the stomach and bowel.

A study of the prescriptions written for dilute hydrochloric acid revealed that the dose varied from 3 to 30 drops, and that 10 drops was the average dose. This may be a reason why so much doubt has been cast upon the value of the use of dilute hydrochloric acid in the treatment of achlorhydria. Personally, I believe dilute hydrochloric acid has a place in the treatment of achlorhydria if it is used in adequate doses and in the following manner:

PRESCRIPTION

Dilute hydrochloric acid 60.
Syrup of citric acid q.s. ad. 120
Sig: 1 or 2 teaspoonfuls in ½ glass of water sipped with the meals.

COMMENT

1. Single ingredient
2. Official preparation
3. Accurate dosage--30 to 60 minims to each teaspoonful.

By taking this as directed, it is intimately mixed with the food, and the food acts

to remove it from the teeth. The use of a drinking tube is inefficient, as can be readily determined, if you should aspirate some colored solutions and note how thoroughly they will be deposited upon the teeth. The most efficient manner of removing it is to have the patient wash his mouth out with a glass of water containing a teaspoonful of baking soda after meals, warning him not to swallow it and thus offset the action of the hydrochloric acid.

Syrup of citric acid has been the best vehicle in our hands to mask the taste of the dilute hydrochloric acid. If a patient is working, and you desire to use a solidified form, the proprietary preparations in New and Nonofficial Remedies, such as acidulin (glutamic hydrionic acid), can be used in adequate dosage.

PRESCRIPTION

Acidulin pulvules.
M. 100 such.
Sig: 2 to 3 with each meal with water.

Each pulvule represents 10 minims of dilute hydrochloric acid U.S.P., and this would give the patient 30 minims with each meal.

Innumerable prescriptions for gastrointestinal enzymatic substances appeared in our survey.

Pepsin is absent from the gastric secretion only in pernicious anemia, otherwise there is always an adequate amount present to accomplish its function, as it is a catalytic agent.

Pancreatic enzymes are absent only when there is a complete block of all of the pancreatic ducts such as in carcinoma of the head of the pancreas, which prevents the enzymes from reaching the duodenum, or in another infrequent condition--pancreatic fibrosis--which results in steatorrhea.

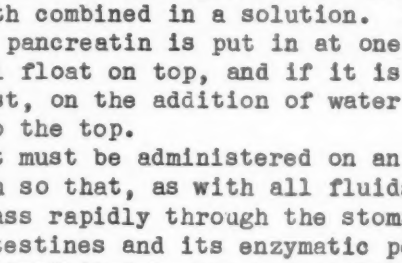
Pancreatin is destroyed by the hydrochloric acid action of the stomach. Therefore, it must be administered in such a manner as to escape this action. This can be accomplished by enteric tablet coating or by use of the following prescription:

PRESCRIPTION

Pancreatin (Fresh) ½ lb.
Sig: As directed.

The directions to be given to the patient are as follows: Take one heaping teaspoonful in a half a glass of water, one hour after each meal. Put a small amount of this in a glass, add a very little cold water to make a paste, then gradually add more water and more pancreatin until these are both combined in a solution. If all of the pancreatin is put in at one time, it will float on top, and if it is all put in first, on the addition of water it will come to the top.

It must be administered on an empty stomach so that, as with all fluids, it will pass rapidly through the stomach into the intestines and its enzymatic power will not be inhibited by the hydrochloric acid. This is the best way to administer the enzyme.



GLUTAMIC ACID HYDROCHLORIDE

Pepsin is seldom used in its pure state today as a necessary enzymatic substance. In our survey its principal appearance was that of a vehicle in the form of the elixir pepsin compound, and usually a proprietary product was prescribed. The official preparation is as follows:

PRESCRIPTION

Agent ?
Elixir pepsin comp. N.F. q.s.ad. 120
M.
Sig: Teaspoonful as desired.

COMMENT

1. Single preparation used as a vehicle.
2. Official.

3. Pleasant tasting.

B E L L A D O N N A

The belladonna group could be designated the "digitalis" of the gastro-intestinal tract. Belladonna is an agent which has a most beneficial effect if used in proper dosage. One considers the digitalization of a patient in the terms of the dosage necessary to produce a clinical result in congestive failure, and not an average dose in minims, drops, or grains. The same should hold in the administration of belladonna. It has very little action on the amount of or the acid values of the gastric secretion. Its characteristic action is that in dosage to tolerance it diminishes hyperperistalsis and spasm. As we have criteria for the evidences of digitalization, so we have the same for the action of belladonna. It should be given in dosage to produce dryness of the mouth, some dilatation of the pupils, blurring of vision, and some irritation of the skin.

We found it used 96 times in combination, most frequently being combined with a sedative. This, I believe, is incorrect because, if there is inadequate belladonna action, you cannot increase the belladonna without increasing the dose of the sedative, which may not be desired. The same holds if you desire to reduce the dose of the sedative and not of the belladonna. It should always be used as a single ingredient, so that the dose can be manipulated to produce the definite physiologic action desired.

One of the situations we discovered was the failure of the profession to realize the difference between drops and minims. To give an explicit example, 15 minims of the tincture of belladonna equals 1 cc., but equals 50 drops measured by the common droppers used today.

NUMBER OF DROPS OBTAINED FROM STANDARD DROPPER

Liquid (15 minims in 1 cc.)	Drops per cc.
Distilled water	22.2
Alcohol	50.0
Tincture of digitalis	50.0
Tincture of belladonna	50.0
50 per cent solution of KI	28.0

We must remember that 15 minims of tincture of belladonna equals 50 drops measured out. The size of the drop depends upon the size of the aperture of the dropper, the way the dropper is held, and whether it is an aqueous, oily, or alcoholic solution. This problem is revealed very clearly in the table.

For that reason we are inclined to use solid drugs rather than liquid agents. In order to administer properly a drug of this type in a liquid form, one must use a standardized dropper, a minim glass, or have the pharmacist measure out with the dropper how many drops will equal the proper minim dosage. We advise the use of the solid form:

PRESCRIPTION

Extract of Belladonna 0.015 (¼ grain)
or
0.008 (1/8 grain)
M. et ft. T.T. #30 such.
Sig: 1, one-half hour before meals.

It is timed for one-half hour before meals so as to induce its action on the motility of the stomach, the hyperperistalsis, or the spasm. The dose is altered until a pharmacologic effect is secured.

Innumerable preparations have been offered to take the place of belladonna. In our institution we have found that nothing equals it, and it is far superior to have the patient under the physician, the intern, or the house staff learn thoroughly the action of belladonna and the dosage of it rather than to confuse him with innumerable preparations or combinations.

D I G I T A L I S

When we came to the study of digitalis, we had 87 prescriptions to analyze, and I will mention that the name of a firm's product should be specified. If you pick out a suitable form of digitalis from a firm in which you have confidence, it is an advantage to prescribe it.

Digitalis should never be given with another drug. It does not do well in combination with another drug for the same reasons I have enumerated in regard to belladonna. If you combine it with a sedative you may want to change the dose of the other agent and not the digitalis, so again I return to that phrase that was mentioned before: we are using doses to produce a clinical effect. It is not the cardiogram that guides the dosage; it is not anything but the fact of the improvement of the patient. The edema disappears, the patient breathes better, and the size of the heart as revealed by clinical examination improves under adequate doses of digitalis, which varies with each individual.

When we remove certain components of drugs, we are also taking out some of their therapeutic advantages. That is true in regard to digitalis. All are agreed that digitalis is not as efficient if some of the glycosides are removed. Digitalis use dates back to the seventeenth century, and its originator, William Withering, used digitalis in a dosage to produce a definite clinical response as indicated to him by the occurrence of the symptoms of nausea and vomiting, when he reduced his dose accordingly.

Digitalis in drop dosage was specified so that the average dose was 36 drops per day. Minims were specified so that the average daily dose was 9.6 minims. More than one-half of the digitalis prescriptions used this, which I believe under present standards could be classified as inadequate.

I believe that the best form of digitalis to use is the pill containing 1½ grains or 0.10 of the powdered leaf. One pill equals 1 cc. of the tincture or 15 minims or 50 drops.

PRESCRIPTION

Digitalis powdered leaf 0.10
(1½ grains)
M et ft Tabs. # 30 such.
Sig: As directed.

The new Twelfth Revision of the Pharmacopoeia has reduced the strength of digitalis 17 per cent, and it behooves each of us to read carefully this portion of the Pharmacopoeia in order that our patients who have taken digitalis tablets as made under the Eleventh Revision do not now suffer from inadequate dosage by using the new strength tablet.

When we reached the prescriptions written for agents whose action is on the biliary tract, and the cough mixtures, there was considerable confusion and many inaccuracies. The majority of the cough mixtures were for multiple ingredients, containing from three to eight agents. The average dose usually contained too small an amount of the most active component, usually an opium derivative, to be of value. One ounce of many of these mixtures contained from 1/32 to 1/60 of a grain of opiate. Considering these prescriptions, it would be necessary to use two to three ounces for an effective sedative cough mixture.

I should like to advise against the use of these multiple ingredient preparations, and suggest the use of codeine in the following manner:

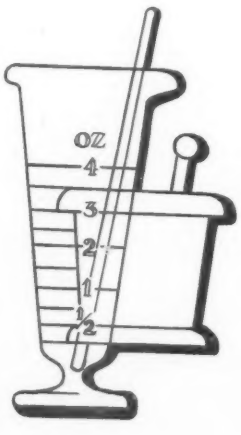
PRESCRIPTION

Codeine Sulfate 0.03 (½ grain)
M. et ft. Tabs. # 20 such
Sig: as directed.

In this way you again use a single ingredient, and the dosage can be manipulated so that it can be given at a time when the cough is most disturbing, such as at bedtime.

Ammonium chloride seems to be most accepted as an excellent expectorant, if used in proper dosage, which is 15 to 30 grains or 1 to 2 grams, three to five times a day. An excellent vehicle for this is syrup of licorice.

PRESCRIPTION



Ammonium chloride 30.0
or 1 oz.
Water 60.0
Syrup of licorice
q.s.ad.120.0
M.
Sig: As directed in
½ glass of water.

Terpin hydrate is another expectorant which should be used alone and in adequate dosage. The official preparation

does not convey this amount. A far better prescription is:

PRESCRIPTION

Terpin hydrate 0.30 or 5 grains.
M. et ft. #40 such caps.
Sig: one, four times a day, with ½ glass of water.

Basically, we should remember that coughing and expectoration may be of value in preventing the plugging of the smaller bronchial tubes with subsequent atelectasis. Use expectorant agents alone and not combined with codeine, as their actions are exactly opposite.

In regard to the biliary tract, there are two fundamental principles to remember. Do we desire to stimulate the secretion of bile, or do we wish to empty the gallbladder? The single best method of stimulating secretion of bile and the emptying of the gallbladder is the Boyden meal of food containing milk, cream, and eggs, which stimulates the evacuation of the gallbladder and the secretion of bile.

To stimulate the evacuation of the gallbladder alone, some form of oleic acid or powdered egg in capsules as used by bakers, is excellent for this purpose:

PRESCRIPTION

Powdered egg 0.60 (10 grains)
M et ft #70 such capsules.
Sig: Three with a glass of hot water before meals.

The flow of bile is stimulated by the administration of fel bovis, or oxgall, in the following manner:

PRESCRIPTION

Fel bovis 0.60 (10 grains)
M et ft # 30 such capsules.
Sig: One with a glass of hot water twenty minutes before meals.

PRESCRIPTION

Dehydrocholic acid 0.24 (3 3/4 grains).
M et ft # 30 such.
Sig: One with a glass of hot water before meals.

Dehydrocholic acid increases the watery content of the biliary secretion.

There is questionable value in the use of these products in diseases of the liver as to whether the damaged cell should be stimulated to produce more bile by the use of these products, although it has been demonstrated that these agents may produce increased blood flow and in this way the liver cell anoxia is reduced.

In pregnancy, women may so alter their diet that they do not take enough substances such as eggs and fats to stimulate the emptying of the gallbladder, and this may be a factor in the formation of metabolic gallstones. We have advised all the pregnant women in our practice to take a Boyden meal twice a week during their pregnancy in order to empty the gallbladder and prevent the formation of stones.

I should like to call your attention to a new preparation--iso-elixir--an alcoholic elixir in which, without directions from the attending physician, the pharmacist can alter the alcoholic content to render many products more soluble. Syrup of raspberry is one of the new pleasant vehicles.

The result of our study is not disappointing or discouraging, but it is disturbing to the degree that we resort to new preparations too readily, we may be guilty of using inadequate dosages, and we prescribe too many multiple ingredient preparations. The element of excessive cost should be considered when official preparations, usually of superior merit, should be used. Primarily, animal and human experimentation has revealed the accurate pharmacologic actions of many of the common older agents to such a point that their continued use is advocated, and the timing of the administration of these agents is exceedingly important.

AN APOTHECARY AND HIS ASSISTANT PREPARING HERBS
(from a woodcut, 1538.)

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